

Terms of Reference

for

Consultancy Services to Review Detailed Feasibility and Design Studies and Construction Supervision of Bwanje Valley Extension and Lembani Irrigation Schemes

Reference No MW-MOA-375529-CS-QCBS

1 BACKGROUND

The Government of Malawi, will implement the second phase of the Agriculture Commercialization (AGCOM) Project. This phase will be financed by multiple financiers with World Bank IDA grant financing estimated at cost of US\$250 million, GAFSP estimated at US\$15 million and new Multi Donor Trust Fund (MDTF) estimated at US\$22 million. The Project was approved by World Bank Board of Directors on 31st May 2023 and by Parliament on 5th August, 2023 under the name “Malawi Food Systems Resilience Program (MFSRP)”.

This Project is expected to be implemented for a period of six (6) years from 2023 to 2029. The key implementing agencies are the Ministry of Agriculture (MoA) as lead and Ministry of Trade and Industry (MoTI).

The objective of the Project is to increase commercialization of agriculture value chain products selected under the Project. The second phase of the Project consists of five main components apart from coordination, management and monitoring and evaluation namely: (i) Building Resilience; (ii) Sustainable Development of Natural Resources for Resilient Agricultural Landscapes; (iii) Getting to Market; (iv) Promoting a Greater Focus on Food Security Resilience in National and Regional Policymaking and (v) Contingency Emergency Response Component (CERC).

Component 2 which supports the Sustainable Development of Natural Resources for Resilient Agricultural Landscapes, will finance the construction of medium-to-large-scale irrigation schemes and technical assistance for the management of their catchment areas. Two irrigation schemes have been prioritized in the initial phase to be constructed, namely; Dwambazi Irrigation scheme in Nkhotakota and Mwenilondo Irrigation Scheme in Karonga. Detailed Designs, Tender documents and Environmental and Social Impact Assessment (ESIA) reports for the two schemes were developed in 2021 with funding from Irrigation Fund for Agriculture Development (IFAD) in compliance to the Social, Environment and Climate Assessment Procedures (SECAP).

The new project (AGCOM 2.0) will be implemented under the World Bank Environmental and Social Framework (ESF). It is therefore with this background that the MoA wishes to engage a consulting firm to review the designs and supervise construction for Dwambazi and Mwenilondo Irrigation Schemes to conform to the new ESF requirements.

The implementing agency (MoA) would like to engage the services of a **firm** to act as Consultants for the review of detailed feasibility and designs studies and construction supervision of two new irrigation schemes to contribute to the development of climate resilient land and water management systems for smallholder households in irrigated lands.

2 OBJECTIVES OF THE ASSIGNMENT

The objectives of the assignment are:

- a) To review detailed feasibility study reports for the targeted irrigation schemes
- b) To review climate resilient detailed engineering designs for the targeted irrigation schemes
- c) To prepare detailed bidding documents for the works
- d) To provide engineering supervision and quality service during the construction works

3 LOCATION

The consultancy services will be undertaken in the two (2) irrigation schemes from the two district of Dedza and Neno identified in the National Irrigation Master Plan and Investment Framework (2015-2035) as indicated in Table 1.

Table 1: Location and Basic Data of Targeted Irrigation Schemes

LOT	ID No.	Scheme Name	District	Study Level	Target Area (ha) ¹
2	1	Bwanje Valley Extension	Dedza	Detailed designs	1400
	2	Lembani	Neno	Detailed designs	800
Sub-Total					2200

In the event that any one priority schemes do not qualify for further development, replacements will be taken from the reserve list in the order of priority as listed in Table 2.

Table 2: Irrigation Schemes Reserve List

ID No.	Scheme Name	District	Study Level	Target Area (ha) ²
3	Lupenga	Mzimba	Detailed Designs	629
4	Mpamba	Nkhatabay	Detailed Designs	798
Total area				1427

The local Consultants should be those registered with National Construction Industry Council (NCIC) while the International Consultants will be registered with NCIC and should partner with a local registered Consultant. In the interest of quality and timeliness of the assignment, the Client shall not award more than one Lot to one Consultant.

¹ The Consultant should not be limited to the target areas listed herein if more area for development can be identified by adopting climate resilient and water efficient irrigation methods

² The Consultant should not be limited to the target areas listed herein if more area for development can be identified by adopting climate resilient and water efficient irrigation methods

4 SCOPE OF ASSIGNMENT

4.1 STAGE A: REVIEW OF DETAILED FEASIBILITY AND DESIGN STUDIES

This is the first stage of the assignment and the duration shall be limited to 2 months due to availability of existing detailed feasibility and design study reports for the irrigation schemes as prepared under the existing Kulima Technical Assistance being financed by the European Union (EU).

4.1.1 Review of Detailed Feasibility Studies

The Consultant shall review the Detailed Feasibility Study Reports for all the two irrigation schemes indicated under Lot 1, taking into consideration all the terms of reference. The Consultant should propose a format for the reviewed feasibility study report, during the inception phase that shall be agreed with the client. The report shall be submitted to the Client for approval before the Consultant proceeds to review the Detailed Designs. The specific tasks for the Consultant in the review of the feasibility study reports shall include but not limited to the following:

- 1. Desk review and familiarization of the Consultant to MFRSP project and World Bank Safeguards requirement**
 - independently familiarize with all available Project Reports, World Bank safeguards instrument or any other that may be available from the project office

- 2. Confirm Qualitative and Quantitative Assessment of Water Resources**
 - independently assess surface water availability at each irrigation intake point and determine the maximum and minimum discharges at the water intake structure taking into account issues of climate change and seasonal variability in the hydrological pattern for the region
 - analyze water quality for irrigation from the identified water sources including a biological, physical and chemical analysis of the water quality in the rainy season to determine suitability for use as irrigation water
 - assess the peak design flow with respect to the type of the water intake structure, temporary or permanent
 - assess current water utilization levels on upstream and downstream and determine / recommend actual irrigation areas to be developed based on available water resources and information on existing and future demands
 - collect and analyze climatological data to be used in the design of the irrigation schemes, where relevant, from the nearest reliable meteorological stations, in order to establish a historical series of most critical climatological data, or where not available/relevant using monthly reference evapotranspiration available for the agro-climatic zone and monthly precipitation with probability of exceedance of 80%
 - use standard statistical procedures for calculation of probable weather parameters used in the design of irrigation schemes including future climate scenarios, such as effective precipitation in the area

- assess the availability, suitability and the quantity of ground and surface water resources that can be safely abstracted or diverted for irrigation during different months of the growing season at 80% probability of exceedance and possible mitigation measures
- from the identified resources, determine the volume of water available for irrigation for different times of the year including use of dams, ground water, pools, rivers in consideration of downstream users and environmental flow
- use standard statistical analysis, in case of rivers, to determine peak and dry season flows, and estimate water availability in the dry season at 80% probability of exceedance
- determine the impact on downstream users and recommend appropriate conflict management practices as may be required and disaggregate the findings by gender
- conduct detailed studies on sites earmarked for intake weirs to confirm appropriate foundation type and determine the volumes of water that will be available as well as the risks of sedimentation, flooding and possible specific environmental impact and the associated mitigation measures

3. Soils

- Review detailed soil surveys for agricultural production under irrigation, undertake soil analysis in relation to depth and texture, infiltration rate, soil water holding capacity, hydraulic conductivity, electrical conductivity, pH, salinity, and total dissolved solids. Soil surveys can be done by means of identification of existing soil classes by aerial photograph interpretation, followed by field verification and collection of representative samples

4. Geotechnical Investigations

- Review the required geotechnical investigation in accordance with the scope of the proposed works that shall include detailed and thorough field investigations of the soils for structural placement
- responsible for all field data collection and laboratory tests including but not limited to geological and geophysical surveys and mapping, test pitting, material sampling and laboratory testing
- conduct additional geotechnical sampling for soil stability, bearing capacity, seepage
- review and confirm the structural foundation of the hydrological and hydraulic designs for all the structures in a participatory manner in conjunction with the District and ISD irrigation engineers and WUA supervision committee
- confirm locations of suitable construction materials

5. Assessment of Land Use on Scheme Area

- Review land use practices and recommend management practice that will be useful to control land degradation

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- Reaffirm livestock occurrence within the project area, livestock management practice and carrying capacity of the land, and how this will conflict or be compatible with irrigation development
 - Review and analyse with a gender lens, the land tenure and current land use activities and levels of production; this should include use for agricultural activities, livestock, forestry and how they will be affected by proposed irrigation interventions
 - Consider risk of flooding in the designs of the scheme

6. Assessment of Existing Agricultural Activities

- review all available documents regarding crop, livestock and fisheries production, agricultural practice and cropping patterns of the area
- conduct reconnaissance field survey to have an overview of the agronomic practice in the area
- determine crop types, land use patterns, crop rotations, crop water requirements, irrigation water schedule master plan
- review proposed crop enterprises through a participatory manner and in collaboration with the beneficiaries and counterpart staff based on project objectives

7. Review of Irrigation Agronomy study reports

- identify and promote the production of high yielding and high value crop varieties for each individual site, wherever possible and together with farmers
- determine water requirements for the crops and cropping patterns selected for optimal utilization of the available water supply. For carrying out this task, collaboration between the design engineer and agronomist would be essential. Estimate scheme irrigation water requirements using the CropWat Model
- assess the socio-economic implications of the identified crops on the youth, women and all vulnerable gender categories
- advise on crop production calendars for the selected crops and cropping patterns
- develop site specific guidelines for irrigation scheduling of all the selected crops to be grown in the designed irrigation schemes
- estimate the water conveyance and field irrigation water losses and determine the required peak design flow for the main, secondary and tertiary canals
- carry out, on irrigation agronomy, investigation of existing farming systems, land holding sizes, crop production patterns, support services and determine gender issues in the factors investigated

8. Socio-Cultural Aspects and Beneficiary Participation

- collect the names of prospective water users (landowners, tenants) disaggregated by gender and assess the land tenure system and present land use, including the proper identification of beneficiaries and ownership of plots, to ensure that absentee landlords and renting systems are uncovered at an early

stage. Recommendations shall be made, in full consultation with the beneficiaries, for the equitable distribution of land to be cropped

- assess existing beneficiary community-based organization for scheme management, and their capacities to play their role in the development stages of the irrigation schemes. The status of women with respect to decision making, access to and control over land and credit as well as extension services will also be clearly identified. The Consultant is expected to ensure that the outcome of these assessments is properly incorporated into the design of the interventions
- ensure the involvement of the beneficiaries with a representation from the youth, women and all vulnerable gender categories in the design of the projects that is considered desirable and important. Different options for the proposed interventions shall be presented to (in writing, orally and through transect walks) and discussed with farmers, particularly the Water User Associations (WUAs) or Scheme Committees, and any reasonable changes proposed by them will be reviewed, evaluated, and included in the preliminary designs
- assess with a gender lens, the land tenure system and present land use, including the proper identification of beneficiaries and ownership of plots, to ensure that absentee landlords and renting systems are uncovered at an early stage. Recommendations shall be made, in full consultation with the beneficiaries, for the equitable distribution of land to be cropped
- ensure that the options for equitable land realignment and redistribution have been discussed at an early stage, in collaboration with irrigation staff from the districts, to ensure that irrigated fields are accessible to irrigators throughout the year, and existing owners of currently rain-fed (to be irrigated) fields become members and get appropriately accommodated within the community

9. Institutions and Management

- utilize lessons learnt, tools and recommended approaches from other projects on organization and management of irrigation schemes in Malawi, and make appropriate proposals for the institutional and organization setup for the proposed schemes
- draw up detailed plans for capacity building of these organizations in order to prepare them for self-management
- propose and analyse options for the best possible organizational structure of farmers and/or private sector partners including legal entities and how these will be managed and administered should the Private Public Partnerships (PPPs) be recommended (particularly for professional management in larger (clusters of) schemes

10. Economic Analyses

- perform conventional economic analyses for all sites to determine the best development option and the viability of the recommended project options
- specify for all sites the general economic parameters, including but not limited to number of hectares (gross and net), cropping intensity, proposed crops, number of water users, engineer's estimate of cost per hectare and cost per water user. Based on generic criteria the consultant will use these to assess

economic viability and use this in proposed prioritization. Schemes that have parameters which indicate lack of economic viability will undergo further inspection, and would need additional justification to be maintained, or be discarded.

11. Agro-economy and Agribusiness

- assess possible commercial private sector involvement in the development of the schemes (including co-funding options as well as Operation and Maintenance)
- assess potential for contract farming and linkages to a formalized market
- assess potential for value addition and related linkages

12. Environmental Scoping and Review of Environmental and Social Impact Assessment Reports

- review the environmental and social impact assessment report and update the environment and social management Plan (ESMP) based on the proposed structural facilities and operational requirement of each scheme and align with ESF requirements.
- undertake scoping of all the targeted irrigation schemes and collect all necessary information to identify and confirm significant environmental and social impacts as recommended in the environmental and social impact assessment reports for respective irrigation schemes
- recommend / propose structural, biological and operational measures to incorporate in the design and operation of the schemes to mitigate or reduce the negative impacts identified in the ESIA reports

13. Review Detailed Topographic Surveys

- Reaffirm topographic surveys of all the irrigation schemes and intake sites including all associated structures such that the topographic map should include all necessary and relevant structures that need to be developed
- ensure that the coordinates of all intersection points, benchmarks and setting out beacons are tied to the National Survey Grid and levels related to the National Benchmarks
- locate, delineate and survey the boundaries of the proposed irrigation schemes including land-holding sizes
- place a sufficient number (approximately 1 per 20 ha for schemes less than 100ha and approximately 1 per 50 ha for schemes above 100ha) of numerated permanent benchmarks along the boundaries, near the intake, reservoir and within the irrigation scheme
- set out and locate a 20m-grid survey over the proposed area, relate it to properly sited permanent bench marks with a 5 cm maximum tolerance in measured level and the use of a Total Station or Differential GPS is highly recommended without the use of Un-manned Aerial Vehicles (UAV) or drones

- use a Total Station or Differential GPS to ascertain the actual levels especially for control points and canals longitudinal profile around the scheme after the use of UAVs or drones in the preliminary design
- produce location maps (scale: 1:10,000) and sketches for all irrigation sites, and topographic map (scale: 1:5,000) for each scheme with detailed contour lines and all relevant permanent structures in the prospective irrigation scheme like storehouses, huts, houses, roads, tracks, streams, drainage courses, protected and leased areas if any
- the contour lines that are relatively close together indicating a slope that is fairly steep the contour interval will range from 0.50m – 1.00m and contour lines that are further apart indicating a slope that is relatively flat will range from 0.25m – 0.50m

4.1.2 Review Climate Resilient Detailed Designs

The Consultant shall review and complete all aspects of climate resilient detailed designs of all the irrigation schemes whose detailed feasibility reports have been accepted, taking into account the Irrigation Codes of Practice (ICOP), issues of climate change and resilience building. The Consultant shall prepare Construction Drawings, Bills of Quantities (BoQs), Bidding Documents, Technical Specifications as well as any other documents needed to fulfil the objectives of this assignment. The reviewed design report will be discussed and reviewed by the Client. If the report is found acceptable, the consultant will then finalize the report and submit it for final acceptance by the Client.

In detail, the consulting firm shall among others review the detailed designs for the following and make efforts to design simple, robust, climate resilient but cost-effective structures that can easily be maintained and operated by the farmers:

1. Pumping Stations/River Diversion Structures

- Review the detailed design of the water-intake structure on the main stream or identified water source, taking into account the sediment load, peak flows in case of streams and the design capacity of the irrigation system
- provide detailed engineering analysis, design and drawings for:
 - (a) intake structure and respective spillway including stability and peak flood flow analyses for the selected structure
 - (b) silt traps and stilling basin structures for prevention of silt deposits at the intake structure and the irrigation canal networks
- confirm designs for dams / intake weirs, core selection, required protection works and operational procedures
- take into cognizant of upstream degradation and climate change issues in preparation of the designs

2. Night Storage Reservoirs

- Review detailed design, including drawings and calculations of the storage reservoir embankment, inlets and outlets, as well as spillway design, using standard hydrological and hydraulic calculations for base, peak and flood flow

3. Main, Secondary and Tertiary Irrigation Facilities and Hydraulic structures

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- review detailed designs of the main, secondary and tertiary irrigation facilities and structures
 - assess the need for cost-effective canal lining where technically required and economically feasible
 - review hydraulic and stability analysis of the individual structures to ensure proper distribution of water in the canal networks
 - confirm suitable locations and prepare detailed design for structures that may be required along the canals/pipelines
 - confirm and recommend the type of construction materials to be used for such structures as culverts, road crossings, outlets, bridges, inverted siphons, flumes and drop structures
 - ensure the use of standard type of structures to be feasible to facilitate construction and future operation and maintenance

4. Drainage System

- review drainage system design of the scheme, from field to main drain system

5. Flood Protection Structures

- review design any river training and flood protection works that are deemed relevant, climate resilient and feasible for each irrigation scheme

6. Scheme Roads

- review design and position of roads within the scheme along canals, and include where necessary bridges, crossings, and all necessary associated structures
- include the last mile road connecting the scheme to main access road

7. Scheme Buildings

- review the prepared scalable standard and disability friendly designs for scheme buildings, appropriate for the type of irrigation scheme that shall include sanitary facilities (toilets and portable water reticulation), warehouse (for inputs, processing and outputs as well as equipment) and WUA office and identify their approximate location for each scheme (allowing for outdoor space for scheme meetings etc.)

8. Drawings

- review construction design drawings in a participatory manner i.e with the full involvement of farmers and all stakeholders
- review detailed design drawings including longitudinal plan, profiles, and cross-sections of the main, secondary and tertiary systems and typical designs for their respective structures in the correct format and scale as approved by the client
- review design drawings of representative tertiary or quaternary blocks including canals and appropriate on-farm distribution systems
- review detailed design drawings for the intake structure

- ensure that the design drawings should provide sufficient details to allow quantity takeoffs with reasonable accuracy for the cost estimating purposes
- the scale for the Topographic Maps will vary between 1:500, 1:1000, 1:2500 or 1:5000
- the scale for the detailed engineering drawings will vary between 1:10, 1:20, 1:25, 1:50 or 1:100

9. Cost Estimates

- review Bills of Quantities and confidential project cost estimates for the selected irrigation development option expressed in Malawi Kwacha (MK) and a specific conversion to United States Dollar (USD) at the time of preparing the cost estimate
- review the unit rate analysis of various construction pay items of works specific to the project area
- provide full justification for any significant changes in scheme cost estimates from those determined at detailed feasibility

10. Construction Schedule

- prepare separate detailed implementation schedules for activities to be carried out by Contractors for each of the scheme that shall include considerations for partial handover by the contractor and/or use of portions on the scheme during the construction period, where feasible

11. Design Report

- review final design reports for each scheme that shall include the following:
 - (a) All aspects of these terms of reference
 - (b) Economic and financial analysis of the recommended design options, including an analysis of viability
 - (c) Detailed design drawings and calculations
 - (d) Bills of Quantities
 - (e) Confidential Project Cost Estimates
 - (f) Implementation and construction schedules
 - (g) Detailed Counterpart Staff and WUA capacity building plan and content of training program
 - (h) Land tenure description, list of WUA members and description of WUA organization, land consolidation plan
 - (i) Scheme specific Operation and Maintenance Manual
- agree with the client the format of the final reviewed design report
- the report shall be accompanied with all relevant maps, pictures, drawings, calculations, model outputs, geo-referencing, minutes of meetings with local stakeholders and district authorities and project management, and any other relevant details
- in addition to the scheme specific reports, the consultant shall also prepare:
 1. Set of standard drawings used in the exercise
 2. Minutes of meetings

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3. Datasets and associated Metadata
 4. General Maps/Photographs/Video clips
 5. A set of one page fiche (investors' brief) on each project that summarizes the key context and characteristics

12. Bidding Documents

- review the Bidding documents using the World Bank format as specified and approved by the client for competitive bidding
- the applicable models and guidelines for preparation of the bidding documents shall be provided by the client and the Standard Bidding Documents acceptable to most likely financiers will be used
- in general, IDA guidelines will be used as the fallback option, unless there is a clear indication of other source of financing for construction, in which case applicable formats will be used
- the consultant will be responsible for preparation of Special Conditions of Contract and the following additional documents, for each construction contract:
 - (a) Technical Specifications
 - (b) Bills of Quantities
 - (c) Drawings
 - (d) Supplementary information necessary submission of responsive bids

4.1.3 Tendering

The Consultant shall assist the Client during the tendering process including the selection of contractors (the Contractors). The Consultant's role in the process shall include:

1. Assisting the Client to conduct contractors' pre bid site visits and pre-bid meetings
2. Preparation of Technical Responses to queries from Bidders
3. Assisting the Client during the Selection and Evaluation of Contractors for the works
4. Provision of Technical Advice to the Client during Pre-contract Discussions with contractors that may be called upon to negotiate their successful bids.

4.2 STAGE B: CONSTRUCTION SUPERVISION

After the review of Detailed Feasibility Studies and Design reports the Consultant shall proceed to the stage of Construction Supervision and Quality Assurance as follows:

4.2.1 Supervision of Construction Works

The proposed duration for the construction works for each scheme shall be **12 months**. The tasks for the Consultant shall include but will not be limited to the following:

- (a) Evaluating and approving the Contractors' work schedule and working methods to ensure that they are practical and provide for effective and efficient utilization of approved resources
- (b) Ensure the adherence to the availability of the contractor's personnel and equipment on site during the construction period as stipulated in the contract agreement
- (c) Preparing and submitting the following documents for the Client's review and approval:
 - (i) Construction schedule
 - (ii) Payment certification and procedures
 - (iii) Reporting procedures; and upon the Client's approval, approve all pertinent forms, certificates, and other documents to be used by the Contractors
 - (iv) Organisation of monthly site meetings with stakeholders (farmers, contractors and client) where progress and plans shall be discussed
- (d) Verifying that all Contractors proposed to work on the contract are acceptable and also capable of carrying out the works without prejudice based on gender
- (e) Reviewing the Contractors' proposed procedures for investigation, material testing and drawings, and monitoring these activities to ensure conformity with the contract documents
- (f) Supervising the construction works and examining any material to be used or workmanship employed in connection with the works for compliance with the contract drawings and specification
- (g) Supervising soils and materials samplings and conducting tests at the approved laboratory
- (h) Approving capabilities and qualifications of soils and materials testing laboratory selected by the Contractors for special tests; and reviewing laboratory reports and approving the results of tests performed
- (i) Inspecting at delivery and installation such mechanical materials, machinery and plant supplied to be used for the implementation of the works
- (j) Adopting a strict system of quality control, in order to ensure that all the construction works are carried out in accordance with the contract drawings and specifications; and inspecting all construction materials and workmanship for compliance, accordingly
- (k) Suspending work in coordination with the Client, should discrepancies or differences in planned procedure be discovered during construction; and allowing work to resume only after receiving complete agreement of all parties concerned
- (l) Verifying and performing any measurements and quantity computation and issuance of the Interim and Final Payment Certificates and also Certificate of Completion of Works, and performing final measurements and preparation of account upon completion of the

works. Measurements and payments shall be recommended only against those parts of the work which have been duly executed and approved

- (m) With the prior consent and approval of the Client, issuing variation orders or any instructions on extra work order which is likely to increase the cost of work or have an impact on the schedule
- (n) Monitoring the progress of the works and comparing them with the work schedule, and notifying the Contractor of any deviations from the planned programme. Any delay from the planned schedule will be analysed to assess its causes, and the schedule will be amended accordingly to overcome, if possible, this delay
- (o) Maintaining records of the actual costs incurred and periodically forecast the final costs, and preparing the final statement of accounts including amounts paid and outstanding payments
- (p) Assessing the validity and magnitude of the Contractors' claims, and requests for extensions of time; and submitting recommendations to the Client for their settlements
- (q) Prior to the completion of each part of the works, prepare a comprehensive list of items that are required to complete the works, and inspect the works during and upon expiry of the contract period as provided in the contract and before the Contractors delivery of the works to WUAs in the condition required by the contract
- (r) Preparing gender responsive operations and maintenance manuals for each component of the Works in sufficient details to enable the Client's personnel and WUAs to operate and maintain all parts of the works
- (s) Organizing and conducting practical pre-service and on-job training for Counterpart Staff and WUAs (Maintenance Committee) involved in day-to-day activities of the operation and maintenance of the scheme structures
- (t) Ensuring that capable youth, women and all vulnerable gender categories participate in the works without prejudice
- (u) Approve as built drawings as submitted by the contractors at the end of the works executed

4.2.2 Supervision of environmental and social risk management

This include the supervision on the implementation and enforcement of all environment and social risk management to ensure ensure that the Contractor delivers its ES obligations under its contract. This includes, but is not limited to the following:

- a. review the Contractor's Environment and Social Management Plan (C-ESMP), including all updates and revisions at frequencies specified in the Contractor's contract (normally not less than once every 6 months);
- b. review all other applicable contractor's documents related to ES aspects including the health and safety manual, security management plan and SEA prevention and response action plan;
- c. review and consider the ES risks and impacts of any design change proposals and advise if there are implications for compliance with ESIA, ESMP, consent/permits and other relevant project requirements;
- d. undertake, as required, audits, supervisions and/or inspections of any sites where the Contractor is undertaking activities under its contract, to verify the Contractor's compliance with ES requirements (including relevant requirements on SEA/SH);

- e. undertake audits and inspections of Contractor's accident logs, community liaison records, monitoring findings and other ES related documentation, as necessary, to confirm the Contractor's compliance with ES requirements (including relevant requirements on SEA/SH);
 - f. determine remedial action/s and their timeframe for implementation in the event of a noncompliance with the Contractor's ES obligations;
 - g. ensure appropriate representation at relevant meetings including site meetings, and progress meetings to discuss and agree appropriate actions to ensure compliance with ES obligations;
 - h. ensure that the Contractor's actual reporting (content and timeliness) is in accordance with the Contractor's contractual obligations;
 - i. review and critique, in a timely manner, the Contractor's ES documentation (including regular reports and incident reports) regarding the accuracy and efficacy of the documentation;
 - j. undertake liaison, from time to time and as necessary, with project stakeholders to identify and discuss any actual or potential ES issues;
 - k. establish and maintain a grievance redress mechanism including types of grievances to be recorded and how to protect confidentiality e.g. of those reporting allegations of SEA and/or SH.
- l. carry-out the following activities consistent with the Works contract to be supervised, including but not limited to the following:
- support the Works employer to organize an SEA/SH conference, ensure appropriate representation in the conference and follow-up on any agreed actions by the attendees;
 - monitor contractor's compliance with its SEA/SH Prevention and Response Obligations in the Works contract, and take appropriate contractual actions if non-compliance is identified, including upon identification of potential non-compliance by a dispute board;
 - ensure that any allegation of SEA and/or SH that are received by the Consultant are documented, maintaining appropriate confidentiality, and promptly submitted to the Employer and the Contractor;
 - prior to its engagement for the Works, verify that, any proposed subcontractor not named in the contract, is qualified in accordance with the provisions of the SEA/SH performance declaration for sub-contractors;
 - provide appropriate support and relevant documents that a dispute board may need in reviewing SEA/SH contractual compliance;

4.2.3 Defects Liability Period

The duration for the defects liability period for each completed scheme works shall be for **12 months**. In this stage the Consultant shall prepare, together with the Contractors and the District Counterpart Staff, the list of all the defects to be rectified by the Contractors during this period. The Directorate of Irrigation Services shall vet all the defects lists for all the works as prepared and agreed therein. The Consultant shall ensure that, at the end of this period, the Contractors have rectified all the defects outlined in the list prepared for each the sites.

5 DURATION OF ASSIGNMENT

The assignment has been split into two (2) major stages. STAGE A is the Review of Detailed Feasibility and Design Studies for all the targeted irrigation schemes and STAGE B is the Construction Supervision and Quality Assurance up to commissioning of the completed irrigation schemes.

Table 3: Duration for each Lot

Stage	Sub-Stage	Months
		Lot 2
A. Review of Detailed Feasibility, Design Studies and Tender Documents	1. Inception	0.5
	2. Review of Detailed Feasibility Studies	2.0
	3. Review of Detailed Designs	1.0
	4. Tendering	3
Sub-Total		6.5
B. Supervision	1. Construction Supervision	12
	2. Defects Liability Period	12
Sub-Total		24
Grand Total		30.5

6 STAFFING REQUIREMENTS AND QUALIFICATIONS

The following are the minimum qualifications and time input for Consultant's key personnel required to carry out the services:

Stage A: Detailed Feasibility and Design Studies

No.	Key Personnel	Minimum Qualification	Minimum Professional Experience	Time Input in Person Months					Total
				LOT	Inception	Feasibility	Design	Tendering	
1.	Team Leader	MSc Civil Engineering or MSc Irrigation Engineering	<ul style="list-style-type: none"> - 10 years relevant professional experience and registered with the Malawi Board of Engineers or any other internationally recognized Engineers Body - At least 3 assignments as a Team Leader similar in nature and magnitude - Experience in carrying out detailed feasibility studies for irrigation projects - Experience in designing medium to large scale irrigation projects with participation of farmers - Experience in designing and construction medium scale dams - Experience in construction supervision of water related infrastructure projects - Practical knowledge in integrated water resources planning and management with emphasis on climate change and resilience building 	2	0.5	2.0	1.5	1	5.0

No.	Key Personnel	Minimum Qualification	Minimum Professional Experience	Time Input in Person Months					Total
				LOT	Inception	Feasibility	Design	Tendering	
2.	Irrigation Engineer	MSc Civil Engineering or MSc Irrigation Engineering	<ul style="list-style-type: none"> - 10 years relevant professional experience - At least 3 assignments similar in nature and magnitude - Experience in carrying out detailed feasibility studies for irrigation projects - Experience in designing medium to large scale irrigation projects with participation of farmers - Experience in construction supervision of water related infrastructure projects 	2	0.5	2.0	1.5	1.0	5.0
3.	Dam Engineer	MSc Civil Engineering / Dam Engineering	<ul style="list-style-type: none"> - 15 years relevant professional experience - At least 3 assignments similar in nature and magnitude - Experience in carrying out detailed feasibility studies for dams - Experience in designing medium scale dams with participation of farmers 	2	0	1.0	1.0	0	2
4.	Environmental Specialist	MSc Environmental Science or MSc Environment and Social Management Studies	<ul style="list-style-type: none"> - 10 years relevant experience in environmental management with sound knowledge of environmental, gender and other social issues, initiatives and managing mitigation measures - At least 3 assignments similar in nature and magnitude - Experience in carrying out detailed feasibility studies for irrigation projects including dams 	2	0.5	1	1	0.5	3

No.	Key Personnel	Minimum Qualification	Minimum Professional Experience	Time Input in Person Months					Total
				LOT	Inception	Feasibility	Design	Tendering	
5.	Land Tenure Specialist	MSc Land Use Planning and Management or MSc Rural Sociology	- 10 years relevant professional experience - At least 3 assignments similar in nature and magnitude - Experience in carrying out detailed feasibility studies for irrigation projects	2	0.5	1.0	0.5	0	2.0
6.	Agribusiness Specialist	MSc Agricultural Economics	- 10 years relevant professional experience - At least 3 assignments similar in nature and magnitude - Experience in carrying out detailed feasibility studies for irrigation projects	2	0.5	1	1	0	2.5
7.	Hydrologist	MSc Hydrology or MSc Water Resources Engineering	- 10 years relevant professional experience - At least 3 assignments similar in nature and magnitude - Experience in carrying out detailed feasibility studies for irrigation projects including dams	2	0	1	1	0	2
8.	Topographical Surveyor	BSc Land Surveying or Diploma Land Surveying	- 10 years (BSc) and 15 years (Diploma) relevant professional experience - At least 3 assignments similar in nature and magnitude - Experience in carrying out detailed feasibility studies for irrigation projects including dams	2	0	2	1	0	3

No.	Key Personnel	Minimum Qualification	Minimum Professional Experience	Time Input in Person Months					Total
				LOT	Inception	Feasibility	Design	Tendering	
9.	Geotechnical Engineer	BSc Geotechnical Engineering	<ul style="list-style-type: none"> - 10 years relevant professional experience - At least 3 assignments similar in nature and magnitude - Experience in carrying out detailed feasibility studies for irrigation projects including dams 	2	0	1.0	1.0	0	2

Stage B: Construction Supervision

No.	Key Personnel	Minimum Qualification	Minimum Professional Experience	Time Input in Person-Months			Total
				LOT	Supervision	Defects	
1.	Resident Engineer	MSc Civil Engineering or MSc Irrigation Engineering	- 15 years relevant professional experience - At least 3 assignments similar in nature and magnitude - Experience in construction supervision of irrigation and water related infrastructure projects	2	12	4	16
2.	Supervising Engineers - Lot 2 (2) -	BSc Civil Engineering or BSc Irrigation Engineering	- 5 years relevant professional experience - At least 3 assignments similar in nature and magnitude - Experience in construction supervision of irrigation and water related infrastructure projects	2	24	0	24
3.	Inspectors of Works - Lot 2 (2)	BSc Civil/Irrigation Engineering or Diploma Civil Engineering or Diploma Irrigation Engineering	- 5 years relevant professional experience - At least 3 assignments similar in nature and magnitude - Experience in construction supervision of irrigation and water related infrastructure projects	2	24	0	24
4.	Environmental and Social Inspectors & OHS - Lot 2 (2)	BSc Environmental Healthy / Environmental Sciences / Public Healthy	- 5 years relevant field and professional experience - Experience in occupational safety and health	2	12	0	24

7 REPORTS AND SCHEDULE OF DELIVERABLES

The Consultant shall produce a series of reports in English language during the services. These reports shall be submitted to the Client (MoA) through the DoI Director according to the following schedule and in the following quantities. These are merely indicative and does not preclude additional reports that the Consultant may be required to prepare within this consultancy. In addition to the hard copies, the Consultant will also be required to submit the above reports in acceptable electronic formats (e-copy in CD or memory stick/flash disk). The Consultant shall allow for a maximum of 10 working days period in between submission of reports and review by the Client.

Stage A: Detailed Feasibility and Design Studies

Activity Description	Copies	
	Lot 1	
Effective Date of Contract	X	
i. <u>Inception Report</u> : shall contain the preliminary assessment of the schemes highlighting various developments study options, detailed execution plan, approach and methodology including staffing schedule, revised work plan and budget	$A = X + 0.5$	Ten (10)
ii. <u>Reviewed Draft Detailed Feasibility Study Reports</u> : shall contain, among others, water resources assessment report, construction design options report with indicative preliminary costs of each option, results of the preliminary assessment of irrigation schemes and recommendations for any essential changes in the designs	$B = A + 0.5$	Ten (10)
iii. <u>Review Final Detailed Feasibility Study Reports</u> : shall be submitted after fully incorporating the comments raised in the draft detailed feasibility study reports.	$C = B + 0.5$	Ten (10)
iv. <u>Review Draft Detailed Design Report</u> : one design report for each scheme based on the selected option as recommended by the Client and stakeholders	$D = C + 0.5$	Ten (10)
v. <u>Reviewed Final Detailed Design Report</u> : shall be submitted after fully incorporating the comments raised in the draft detailed feasibility study reports and any changes suggested will be incorporated into the final report or noted with reasons why they were not accepted.	$E = D + 0.5$	Ten (10) per scheme
vi. <u>Draft Bidding Documents</u> : to be submitted in the required format as agreed with the Client and the Client shall provide the required and acceptable formats	$F = E + 0.5$	Ten (10) per Lot
vii. <u>Final Bidding Documents</u> : to be submitted not more than half a month after submission of the final design report for each scheme	$G = F + 0.5$	Ten (10) per Lot

Stage B: Construction Supervision

Activity Description	Copies	
	Lot 1	
Effective Date of Contract	Y	
i. Supervision Reports: within five (5) days after the beginning of each month, reporting on progress of the Works; updating the schedule and disbursement. The report should cover the review of the Contractor's proposed Construction Program and recommendations for any essential changes in the Program and the Services Work Plan including listing of possible problem areas that may affect the progress of the Works	$H = Y + 12.0$	Ten (10)
ii. Defects and Final Assignment Report: within thirty (30) days before the completion of the services including Defects report, As-built Drawings, Operation and Maintenance Manuals, detail description of the services performed, handover certificates and Final Accounts of the Works, comparison of cost and budget of the works including detailed description of any changes in the cost of the Works	$I = H + 12.0$	Ten (10)

CAPACITY BUILDING AND TRANSFER OF KNOWLEDGE

The overall objective of the capacity building will be to improve the knowledge of the Department of Irrigation (DoI) staff in designing of irrigation infrastructure and construction supervision of the works.

a) Counterpart Staff

From each of the assignment districts, one (1) staff member from the Department of Irrigation (DoI), preferably an Irrigation Engineer, will be provided as counterpart staff on full time basis (the Counterpart Staff). The training of the Counterpart Staff will be on the job. The Counterpart Staff will be given specific pre-planned and agreed assignments geared towards improving his/her capacity. The Consultant will provide a detailed on-the-job training program for the Counterpart Staff at the beginning of the contract. Assigning of activities/work to the Counterpart Staff shall in no way take away any of the responsibilities of the Consultant in delivery under this consultancy; hence should the Consultant see the possibility of delays occurring due to the use of the Counterpart Staff on any particular activity, the Consultant must inform the Client and then undertake the activities using its own staff with the objective of completing the activity with no delays. The Counterpart Staff shall also assist the Consultant in (a) beneficiary mobilization for meetings; and (b) provision of any available and required background information and data.

b) Collaboration with PCO Specialists

The Consultant shall work closely with the Project Coordination Office (PCO) through the PCO Engineer and the Department of Irrigation in all processes to ensure quality and adherence to specification towards achieving the objectives of the Programme. The DoI, in coordination with PCO Engineer, will have overall technical responsibility for preparing and/or interpreting designs, BoQs, tendering and engineering cost estimates prepared under the Programme. The PCO Engineer shall report to DoI on all technical matters related to the assignment.

8 RESPONSIBILITIES OF THE CONSULTANT

The Consultant shall carry out the services in a professional manner in keeping with internationally accepted standards, using qualified and appropriate staff. The Consultant may add additional experts deemed necessary to successfully undertake the assignment. These additional experts shall endeavour to implement the services with diligence and within the time frame agreed upon in the contract. The Consultant shall furnish to the Client updated curriculum vitae (CVs) of each team member proposed for the assignment. The Consultant's staff shall be ready and willing to work with Government of Malawi staff.

The Consultant shall be responsible for complying with all applicable regulations regarding staff, including but not limited to staff salaries, benefits, and welfare. The Consultant shall also be responsible for freight, travel (including visas) and any other costs for the team members. The Consultant shall not be allowed to change the key team members (Team Leader, Engineers) from the team in the technical proposal. Notwithstanding the above, the Consultant shall replace any other staff member who is unable to carry out the work or is considered by the Client to be unsuitable, with similar or better-qualified members of staff acceptable by the Client.

The Consultant shall be responsible for its head office support costs, the cost of housing and other services for staff on the services and procurement of all office equipment, needed for the assignment. The Consultant shall be responsible for arranging and meeting the cost of all supporting services e.g. printing of reports. In particular:

- **Consultant Office**: Office space can be rented by the Consultant in the main city for each district of the assignment. Provisions for adequate office space should be made in the proposal.
- **Transportation**: The Consultant shall provide and pay for all costs of transportation for its staff for the duration of its services. In line with the available budget, and after consultation with the Client, the Consultant shall procure a vehicle(s) for the assignment.
- **Equipment and Furniture**: Proposals by the Consultants should include provisions for office equipment and furniture, and surveying equipments.
- **Laboratory Tests**: Provisions for field-testing equipment should be included in the proposals. Required tests can be carried out by approved outside laboratories at the Contractors' expense.

At the end of the contract, all items (including vehicles) procured for the assignment (and included in the cost schedule proposal), or for which reimbursement was claimed and received shall be handed over to the Client. The Consultant shall also keep complete records of all services and works carried out and handover to the Client all documents, working papers, calculations and computer data produced during the assignment.

9 INSTITUTIONAL AND ORGANISATIONAL ARRANGEMENTS

At National level, the assignment shall, to a larger extent, be managed using the MFSRP governance structures and the PCO Engineer shall have the overall responsibility and provide first line supervision of the consultancy with technical guidance from the Implementing Department (DoI). The assignment shall be managed by the Client, who shall be responsible for liaison between the GoM and the Consultant as well as the provision of any assistance to the Consultant as required under the contract.

The Client may engage the services of other Experts (IPE) to assist in the review of dam designs for the proposed new irrigation schemes to contribute to the development of climate resilient irrigation systems. The primary purpose of the IPE shall be to review and advise the Client on matters relative to Dam safety and other critical aspects of the Dam, its appurtenant structures, catchment area, area surrounding the reservoir and downstream areas. The IPE shall be mandated to provide an independent assessment and review of technical and environmental issues associated with the project. **The IPE shall be required to act independently from central or district government institutions** and shall act in accordance with relevant GoM and IDA guidelines. The IPE will play a decisive role throughout the design and construction of the dams that shall potentially be designed for the irrigation schemes. The opinion of the IPEs will be provided through the Directorate of Irrigation Services and shall be considered and reflected in the final products of the Consultants' reports.

At Regional level, the Consultant shall be required to work hand in hand with the head of Irrigation Services Division (ISD) under which the irrigation schemes falls within. The primary responsibility of the ISD head shall be to provide backstopping of all activities under the assignment for the districts concerned. He/she will also participate in determining construction requirements, construction supervision and final certification of works. In this regard the Consultant shall also provide on-site training to the ISD staff (preferably at the beginning of the Construction) on how to monitor construction works, identify and resolve conflicts between water users and contractors, ensure gender inequalities are reduced or not perpetuated, understanding the process and procedures of construction scheduling, assessment of damages to private land or property during construction.

At District level, the Consultant shall be required to work hand in hand with the District Irrigation Officer on the assignment and a selected committee of Water Users Association (WUA) appointed by the beneficiaries of the irrigation scheme (or the responsible Committee of the irrigation scheme). The primary responsibility of the District Irrigation Officer and WUA Committee shall be to provide liaisons between the water users, Consultant and the contractors during the assignment. They will also participate in determining construction requirements, construction supervision and final certification of works. In this regard the Consultant shall provide on-site training to the District Irrigation Officers and WUA Committee (preferably at the beginning of the Construction) on how to monitor construction works, identify and resolve conflicts between water users and contractors, ensure gender inequalities are reduced or not perpetuated, understanding the process and procedures of construction scheduling, assessment of damages to private land or property during construction.